Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

Y OF
RECEIVED
APR 8 1944
GOVT. SOURCE

[In binding the bulletins for 1904, pages i-xii at the end of this bulletin should be detached and placed before Bulletin 100, which begins with page 1.]

Maine Agricultural Experiment Station

BULLETIN No. 111. DECEMBER, 1904.

FINANCES, METEOROLOGY, INDEX.

This bulletin contains the newspaper bulletins published in 1904, the summary of the meteorological observations, the report of the treasurer, and the index for the bulletins issued in 1904. Bulletins 100 to 111 make up the Twentieth Annual Report of the Station.

Requests for bulletins should be addressed to the
AGRICULTURAL EXPERIMENT STATION,
Orono, Maine.

MAINE
AGRICULTURAL EXPERIMENT STATION,
ORONO, MAINE.

THE STATION COUNCIL.

President George E. Fellows	*President*
Director Charles D. Woods	*Secretary*
John A. Roberts, Norway	*Committee of Board of Trustees*
Charles L. Jones, Corinna	
Albert J. Durgin, Orono	
Augustus W. Gilman, Foxcroft	*Commissioner of Agriculture*
Eugene H. Libby, Auburn	*State Grange*
Charles S. Pope, Manchester	*State Pomological Society*
Rutillus Alden, Winthrop	*State Dairymen's Association*
James M. Bartlett	*Members of the Station Staff*
Lucius H. Merrill	
Fremont L. Russell	
Welton M. Munson	
Gilbert M. Gowell	

THE STATION STAFF.

The President of the University.

Charles D. Woods	*Director*
James M. Bartlett	*Chemist*
Lucius H. Merrill	*Chemist*
Fremont L. Russell	*Veterinarian*
Welton M. Munson	*Horticulturist*
Gilbert M. Gowell	*Stock Breeding and Poultry*
Edith M. Patch	*Entomologist*
Herman H. Hanson	*Assistant Chemist*
Sanford C. Dinsmore	*Assistant Chemist*

NEWSPAPER BULLETINS PUBLISHED IN 1904.

Chas. D. Woods.

Whenever there is a matter of importance which we wish to bring promptly to the attention of the people of the State, we make as clear and concise a statement as possible in the style and type of a newspaper column and mail it as a "Special Newspaper Bulletin" to all the press on the Station exchange mailing list. These newspaper bulletins are quite generally printed by the papers, and the Station is under obligations to the press for this opportunity of specially and promptly being put in touch with the people.

During the year the Station has issued several special newspaper bulletins on miscellaneous subjects. The subject matter of five of the newspaper bulletins has not appeared in any of the regular bulletins of the Station and are therefore here reprinted as a matter of permanent record.

RE-TOPPING SWEET APPLE TREES.

A correspondent recently sent to the Maine Agricultural Experiment Station the following questions which were answered by Professor W. M. Munson as below:

"Can sweet apple trees be successfully grafted? Will it pay to re-top a large sweet apple tree, a foot or more in diameter? Should an orchard of 100 trees be all of one variety?"

It is very doubtful if the flavor of the fruit has any relation to the value of a given tree for purposes of grafting. Tolman Sweet is often used as a basis for top-working.

Apple trees up to a foot in diameter may be top-worked if unsatisfactory. Care, however, should be used that too much of the top is not removed in any one year. Cut off about one-third of the top the first year and insert cions on stubs not more than two or three inches in diameter. The next year remove more of the top and insert other cions, and the following year complete the work.

It is not advisable to plant a solid block of 100 trees of one variety unless there are other trees in the immediate vicinity. Some varieties are self-fertile and will give satisfactory results if planted alone; but it is always safer to provide for cross fertilization. In large orchards every third or fourth row should be of a different variety. Two or three varieties are enough for a commercial orchard, however, and it is seldom advisable to plant more.

MULCHING FOR APPLES TREES AND GOOSEBERRIES.

A correspondent recently sent to the Maine Agricultural Experiment Station the following questions which were answered by Professor W. M. Munson, as below:

"Is the waste from shingle mills ("shingle hair") a better mulch for apple trees than sawdust? Is there any objection to pine needles as a mulch for gooseberry bushes?"

Shingle edgings ("shingle hair") are excellent for mulching either apple trees or strawberry plants. As in the case of sawdust, it is better to use material that is not quite fresh; or take precautions so as to keep it from packing closely about the base of the tree. Sawdust is the most satisfactory material ever used at the Station as a winter protection and summer mulch for strawberries. It conserves the moisture effectively and is free from weeds.

The best mulch for gooseberries, as for other small fruits, is a fine dust cover provided by thorough cultivation. If for any reason this can not be given, I see no objection to the use of pine needles or the "shingle hair," referred to above.

TESTING VITALITY OF SEEDS.

Owing to the unfavorable season of 1903, many kinds of seeds failed to mature properly and it is probable that there will be many disappointed growers during the present season. Prof. W. M. Munson makes the following suggestions, whereby it is possible for every farmer to know just what to expect from his corn, oats, peas, clover or other crops, and to plan accordingly. If he knows that only 50 per cent of his corn will germinate, it is an easy matter to plant twice as much; but if he plants the usual amount and gets only half a stand, the case is much more serious.

A simple test of the vitality of any farm or garden seeds can be made as follows: Place 100 seeds, taken at random from the stock which is to be planted, on a dish of sand, cover from ½ to 1 inch with sand, moisten and keep in a warm place, as behind the kitchen stove, until the sprouts appear. The number of sprouts which appear will give an idea of the percentage which may be expected to grow. Care should be taken that the seeds are kept moist, but not too wet. It is advisable to make more than one test, and be guided by the average results. A test of this kind is more valuable than one in which the seeds are placed in blotting paper, for seeds may sprout on paper which do not have sufficient vitality to grow.

OAT SMUT AND ITS PREVENTION.

Oat smut is much more prevalent in Maine than is commonly supposed and while the loss is not total in any field, observations and reports from correspondents indicate that the loss as a whole is large. The disease is propagated by means of the seed, and all that is necessary to prevent smut is to kill the spores that are upon the oats used for seed. This can be accomplished in a number of ways. By treating the seed with water hot enough to kill the smut spores and yet not injure the seed, many growers in the State have materially reduced the smut in their fields. The treatment with formaldehyde is the better one as it is sure, safe, and easy.

The Maine Agricultural Experiment Station has issued a 4-page pamphlet on the prevention of oat smut from which the following is condensed: Half fill an oil or similar barrel with water, and add one-half pound of formaldehyde (sometimes called formalin). Place about two bushels of the seed oats in as wide a sack as will readily go into the barrel, and submerge the oats in this weak solution of formaldehyde for 20 minutes. Lift the sack from the barrel, allow it to drain a few minutes so as not to waste the solution. Then empty the oats on to a clean floor or canvas to dry, and proceed in the same manner until all the seed has been treated.

A solution of formaldehyde the strength recommended above is not poisonous and will not injure the barrel, the sack or clothing coming incontact with it, nor will it interfere with the germination of the oats. On the contrary, the treatment of the seed seems to facilitate the sprouting, hastening it by 2 or 3 days. The seed should be treated long enough beforehand to give it time to dry out before using.

MAKING CLOVER HAY. THE METHOD FOLLOWED AT THE MAINE AGRICULTURAL EXPERIMENT STATION.

The Station has received quite a number of inquiries relative to the method here used in curing clover and similar succulent crops. Prof. G. M. Gowell has outlined our method as follows:

The practice at the Maine Agricultural Experiment Station in curing clover, is to mow it when there is a prospect of dry weather for a couple of days and when it is free from water or dew, and let it lie as cut that day, or, if it has wilted somewhat on the surface turn it by hand or tedder just before night. If not turned the first afternoon it is turned or teddered early the second day and again towards noon.

In the afternoon of the second day it is put into cocks about 5 feet high. Ordinarily it is wilted at this time, but if the weather has turned dark, or the clover is very heavy, portions of it are liable to be unwilted, in which case the cocks are made similar. The cocks are made by using small fork fulls flattened out, so that it will come off in layers when handled again. As it cures it settles, and unless the cocks are high in proportion to their width they will flatten out, which is wrong. The walls are kept perpendicular three-fourths of the way up and then gradually drawn in. Much time need not be consumed in making the bunches, as it is quickly done.

One condition is imperative—the clover must go into the cock free from rain or dew. It can be safely cocked when containing lots of water from its own juices, but not when even a little moist from water.

We allow it to stand in cocks three or four days, or longer, before disturbing it. On a day in which the air is dry we open up the bunches so that the air can draw through them, and usually after about two hours' exposure the hay is ready to draw to the barn. It is not necessary to tear it apart and wear it out, as it readily parts with its own moisture, which is chiefly near the center and the bottom of the bunches.

If rain falls while the clover is in the bunch, it does not wet in deeply after the bunches have been made for a few hours. When rain comes we let the bunches alone, and the water dries out of itself when sound weather comes again.

To successfully cure clover or other fodder plants in this way it is essential to let the cocks alone, and allow them to cure and dry out undisturbed. Clover thus cured and aired out just before putting into the barn does not burn in the mow or come out dusty. In mid-winter a handful from the mow can be twisted into a knot without breaking the stalks or wringing off the leaves.

We also cure green oats and peas in the same way. Out of 32 tons weighed into the barn one year, and fed out in winter, all of the orts made from it by the cattle were collected and saved in one sack!

This method of curing succeeds in ordinary weather. Of course heavy prolonged rains mean defeat to this or any system unless the bunches are covered with cloth or fiber caps.

METEOROLOGICAL OBSERVATIONS.

Lat. 44° 54′ 2″ N. Lon. 68° 40′ 11″ W. Elevation 150 feet.

The instruments used at this Station are the same as those used in preceding years, and include: Wet and dry bulb thermometers; maximum and minimum thermometers; rain-gauge; self-recording anemometer, vane, and barometer. The observations at Orono now form an almost unbroken record of thirty-six years.

The past year was exceptionally cold. During the time that temperature observations have been made at Orono, but three years have exceeded 1904 in this respect. These years, with their mean temperatures, were: 1873, 40°.48; 1875, 39.°20; 1893, 40°.57. That of 1904 was 40.°67, and the mean for 36 years was 42.°15.

The mean temperature for February and December was the lowest thus far recorded here for these months; February being nearly 7°.0, and December 8.°5 below the average. January was 5°.5 and November nearly 4°.0 below the mean.

The total precipitation for the year was a trifle more than that for the preceding year, but was still 6 inches below the average. The fall for November was especially small, not only at Orono, but at most of the stations recorded in the table on page 217.

METEOROLOGICAL SUMMARY FOR 1904.

Observations Made at the Maine Experiment Station.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Mean.	Total.
Highest barometer	30.62	30.47	30.78	30.29	30.16	30.33	30.04	30.25	30.34	30.83	30.50	30.44	30.42	......
Lowest barometer	29.13	29.06	29.32	29.27	29.16	29.44	29.54	29.64	29.10	28.99	29.18	28.83	29.22	......
Mean barometer	29.85	29.87	29.90	29.78	29.81	29.90	29.84	29.90	29.93	29.94	29.76	29.80	29.86	......
Highest temperature	41°.0	43°.0	51°.0	62°.0	82°.0	87°.0	87°.0	88°.0	80°.0	69°.0	50°.0	39°.0	....	......
Lowest temperature	-26°.0	-26°.0	-7°.0	16°.0	29°.0	38°.0	46°.0	40°.0	26°.0	20°.0	0°.0	-27°.0	....	......
Mean temperature	10°.3	12°.2	28°.9	41°.0	58°.1	60°.8	68°.8	64°.2	55°.5	46°.0	30°.4	11°.8	40°.67	......
Mean temperature for 36 years	15°.86	19°.02	28°.11	40°.67	52°.50	61°.25	66°.88	64°.92	57°.26	44°.80	34°.13	20°.34	42°.15	......
Total precipitation in inches	3.63	2.57	3.18	3.13	4.26	2.17	2.43	4.46	6.47	3.10	1.62	2.00	....	39.02
Mean precipitation for 36 years	4.29	3.94	4.45	2.84	3.48	3.53	3.33	3.60	3.41	3.91	3.71	3.77	....	44.26
No. of days with precip. of .01 in. or more	8	11	9	10	11	8	10	10	13	10	7	7	....	114
Snow fall in inches	34.0	18.0	12.0	3.5	....	....	....	....	....	Trace.	5.7	19.2	....	92.4
Average snow fall for 36 years	23.0	21.4	16.2	5.2	0.3	....	....	....	....	0.9	8.2	17.0	....	92.2
Number of clear days	11	9	10	9	12	14	14	18	13	13	11	19	....	153
Number of fair days	5	6	6	5	10	5	10	6	2	6	6	3	....	70
Number of cloudy days	15	14	15	16	9	11	7	7	15	12	13	9	....	143
Total movement of wind in miles	4407	5567	6798	5756	6335	4280	5157	4858	5094	6298	4594	3319	....	......

Monthly and Annual Precipitation (as rain) for the Year 1904.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Bar Harbor	5.37	4.05	5.37	5.02	4.62	1.40	1.72	5.24	9.81	2.55	2.25	4.63	52.03
Belfast	4.86	1.84	3.14	5.06	6.51	1.03	1.23	4.66	6.30	2.91	....	....	....
Cornish	3.39	2.14	3.95	7.67	5.71	2.94	2.24	5.12	5.10	1.41	1.24	1.66	42.57
Eastport	3.04	3.97	4.95	3.36	2.23	1.29	2.10	6.10	5.36	2.54	1.54	2.41	38.89
Fairfield	3.21	1.65	3.78	5.75	4.75	2.32	2.69	4.39	5.58	2.05	1.61	1.44	39.22
Farmington	3.52	0.72	3.13	6.30	5.72	1.03	4.97	4.58	4.44	2.09	1.83	1.76	40.09
Fort Fairfield	....	0.80	0.95	1.35	2.10	....	....	....	....	....	....	1.31	....
Gardiner	4.12	2.24	3.71	7.10	3.95	1.29	1.25	4.53	5.09	2.02	2.39	2.28	39.97
Houlton	4.60	2.35	2.60	2.80	3.65	2.52	2.58	3.00	6.70	3.40	2.20	1.44	37.84
Lewiston	4.26	2.32	3.71	6.74	4.34	2.64	2.39	4.29	3.82	1.88	2.63	1.93	40.95
Mayfield	3.07	1.81	2.76	3.42	6.86	3.17	4.41	5.32	5.73	2.42	1.58	1.47	42.02
Millinocket	3.35	1.89	3.86	2.82	4.38	2.16	4.96	4.06	6.46	3.21	2.20	1.89	41.24
North Bridgton	4.58	2.46	3.47	5.90	4.31	2.87	2.96	5.91	4.25	1.70	1.33	1.67	41.41
Oquossoc	2.86	1.08	2.00	4.56	3.23	2.98	2.89	4.77	6.63	1.69	1.39	1.99	36.07
Orono	3.63	2.57	3.18	3.13	4.26	2.17	2.43	4.46	6.47	3.10	1.62	2.00	39.02
Patten	2.90	0.60	1.02	2.90	4.25	4.15	4.30	2.49	10.42	3.10	1.82	1.50	39.45
Portland	4.04	2.35	2.52	7.51	4.75	2.45	1.03	3.64	3.49	1.16	1.93	1.43	36.30
Rumford Falls	2.88	1.41	2.51	5.72	3.89	2.42	2.34	4.10	4.75	2.76	1.43	1.51	35.72
South Lagrange	2.10	1.50	3.60	3.03	4.85	2.62	4.77	5.10	5.93	2.40	1.92	1.75	39.57
Thomaston	....	2.20	3.79	6.52	7.00	1.68	1.95	4.31	....	....	....	....	....
Van Buren	2.76	2.19	3.28	2.21	5.04	2.74	4.85	2.16	5.10	....	0.74	1.43	....
Vanceboro	3.33	1.10	....	2.83	2.92	....	....	2.14	6.76	2.66	1.48	0.98	....

With the exception of readings from the Orono station, the above table is compiled from the monthly bulletins of the U. S. Weather Bureau.

REPORT OF THE TREASURER.

Maine Agricultural Experiment Station in account with the United States appropriation, 1903-1904.

DR.

To receipts from the Treasurer of the United States as per appropriation for the fiscal year ending June 30, 1904, as per act of Congress approved March 2, 1887	$15,000 00

CR.

By salaries:		
(a) Director and administration officers	$2,500 00	
(b) Scientific staff	4,000 00	
(c) Assistants to scientific staff	1,345 80	
Total		$7,845 80
Labor:		
(a) Monthly employees	$1,410 05	
(b) Daily employees	683 52	
Total		2,093 57
Publications		241 26
Postage and stationery		226 68
Freight and express		217 16
Heat, light and water		443 07
Chemical supplies:		
(a) Chemicals	$195 60	
(b) Other supplies	163 84	
Total		359 44
Seeds, plants and sundry supplies:		
(a) Agricultural	$179 31	
(b) Horticultural	191 52	
(c) Botanical	85	
(d) Entomological	60 29	
(e) Miscellaneous	140 69	
Total		$572 66
Fertilizers		240 04
Feeding stuffs		685 26
Library		265 45
Tools, implements and machinery		291 89
Furniture and fixtures		186 52
Scientific apparatus		172 65
Live stock:		
(b) Cattle	$100 00	
(f) Sundries	17 30	
Total		117 30
Contingent expenses		28 50
Traveling expenses		262 75
Buildings and repairs		750 00
Total		$15,000 00

ISAIAH K. STETSON, *Treasurer.*

I, the undersigned, duly appointed Auditor of the Corporation, do hereby certify that I have examined the books of the Maine Agricultural Experiment Station for the fiscal year ending June 30, 1904, that I have found the same well kept and classified as above, and that the receipts for the year from the Treasurer of the United States are shown to have been $15,000.00, and the corresponding disbursements, $15,000.00; for all of which proper vouchers are on file and have been examined by me and found correct.

And I further certify that the expenditures have been solely for the purposes set forth in the act of Congress approved March 2, 1887.

GEORGE E. FELLOWS, *Auditor*.

Maine Agricultural Experiment Station in account with "General Account" for the year ending June 30, 1904.

Dr.		
To balance from 1902-1903	$120 86	
Sales of produce, fees, etc	6,101 18	$6,222 04

Cr.		
By salaries	$2,813 08	
Labor	358 27	
Feeding stuffs	955 72	
Traveling expenses	451 23	
Buildings and repairs	1,589 67	
Balance to 1904-1905 account	54 07	$6,222 04

INDEX.

PAGE

- Aleurone layer ... 62
- Alfalfa ... 127
- Animal meals, analyses ... 47
- Announcements ... vii
- Aphids ... 179
- Apple maggot ... 169
  - life history ... 171
  - preventive measures ... 172
  - varieties of apple infested ... 177
- Apples infested by apple maggot ... 177
- Apple trees, mulching ... 210
- Asilidæ ... 179
- Balance, income and outgo of nitrogen ... 208
- Beef scraps, analyses ... 47
- Beets, fertilizers, formula ... 150
- Bibliography, reciprocal crosses ... 98
- Biles Ready Rations, feeding experiments ... 124
- Birds, insect-eating ... 166
- Blatchford's Calf Meal ... 56
- Bran, wheat ... 68
  - composition ... 79, 188
  - structure ... 63
- Breads, digestibility ... 73
- Brooder lamps ... 6
- Brooders, portable ... 5
- Brown-tail moth ... 153
  - caterpillars, poisonous qualities ... 156
  - description and habits ... 155
  - history ... 154
  - manner of distribution ... 157
  - remedial measures ... 158
  - winter nests ... 156
- Building, description ... ix
- Cabbage butterfly ... 180
- Callosamia promethea ... 165
- Carrion beetles ... 180

PAGE

- Cecidomyia strobiloides 180
- Cecropia moth 165
- Chemicals, fertilizing, how to mix 139
- Chermes pinicorticis 179
- Chickens, raising by artificial processes 4
  - raising by natural processes 2
- Chicks, methods of feeding 8
  - treatment 7
- Chrysopidæ 179
- Clisiocampa americana 162
  - disstria 162
- Clover hay, composition 188
  - making 213
- Clover silage, composition 188
- Cockerels, feeding for market 9
- Coefficients, digestion, with sheep 193, 196
  - with steers 195, 197
- Concentrated feeding stuffs 59
  - feeds, weights 60
- Corn, fertilizer formula 144
  - fodder, composition 118, 188, 190
  - meal, composition 188
  - silage, composition 118, 188
    - digestibility 119
    - for cows 122
- Correspondence viii
- Cottonseed meal 51
  - composition 39, 188
- Cows, feeding experiments 122
- Cross-fertilization of tomatoes and squashes 81
- Crosses, reciprocal, bibliography 98
- Curtain front house for hens 14
- Decorticated wheat flour 67
- Digestibility of different breads 74
- Digestible protein in flours 74
- Digestion coefficients with sheep 193, 196
  - with steers 195, 197
  - experiments with sheep and steers 185
- Distiller's grains 56
- Drone fly 180
- Entire wheat compared with straight and patent flour 69
  - flour 61, 66
  - bread, digestibility 73
  - composition 79
  - cost 75
  - milling experiment 77
- Eristalis tenax 180
- Euproctis chrysorrhœa 154, 179

PAGE
Fall web worm.................................... 163
Feces, sheep, composition.................................... 188, 189
    steers, composition.................................... 190, 191
Feed flour.................................... 190
Feeding experiments with cows.................................... 122
    stuff, analyses.................................... 39
        inspection 37
            law, chief requirements.............. 37
    test with union grains.................................... 124
Fertilization, abnormal.................................... 84
Fertilizer inspection.................................... 21, 101
    formulas 139
    law, chief provisions.................................... 36
Fertilizers, analyses.................................... 29
    constituents 23
    for beets, formulas.................................... 150
    corn, formulas.................................... 144
    grass, formulas.................................... 145
    legumes, formulas.................................... 148
    potatoes, formulas.................................... 140
    home mixed.................................... 129
        ingredients 134
        manufacturer's view................ 131
        why used.......................... 130
        practicability 132
    in rotation.................................... 151
    valuation 25
Fertilizing chemicals, how to mix.................................... 139
    ingredients, trade value.................................... 26
    materials, composition.................................... 135
        in roots and stubble.................... 138
        required by crops..................... 137
        where purchasable..................... 136
Flour, chemical composition.................................... 71
    entire wheat.................................... 61
    grades 66
    graham 64
Forest tent caterpillar.................................... 162
Gluten feed, composition.................................... 45, 191
    layer of wheat.................................... 62
    meals, analyses.................................... 45
        and feeds.................................... 54
Gooseberries, mulching 210
Graham bread, digestibility.................................... 73
    flour 64
        composition 73
Grass, seeding, formula for fertilizer.................................... 145
Gypsy moth.................................... 161

PAGE

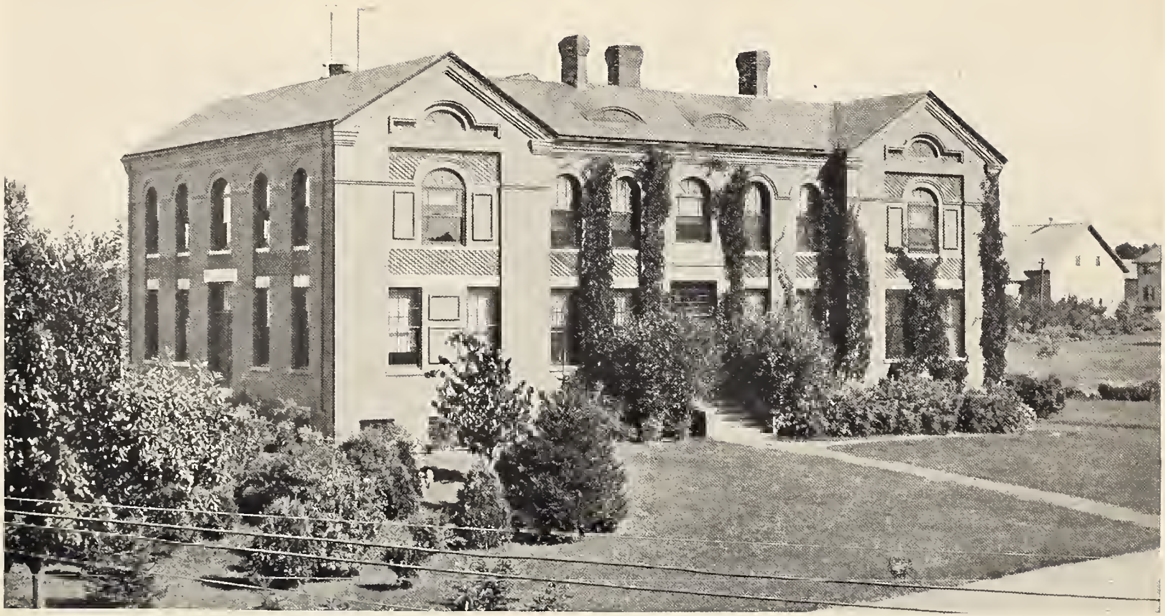
Halisidota caryæ........ 164
Hay, composition........ 188, 190
Hen houses, curtain front........ 14
  pioneer........ 12
  warmed........ 11
Hens, feeding........ 19
  management........ 1
Hickory tiger-moth........ 164
Historical sketch of station........ ix
Holmes, Ezekiel........ xii
  Hall........ xii
Home mixed fertilizers........ 129
Hyphantria cunea........ 163
Income and outgo of nitrogen........ 205
Incubators........ 4
Insectivorous birds........ 166
Insect notes for 1904........ 179
Inspection of fertilizers........ 21, 101
  feeding stuffs........ 37
Inspections........ vii
Lachnus........ 179
Lampyridæ........ 179
Law, feeding stuff, chief requirements........ 37
  fertilizer, chief provisions........ 36
Leaming corn silage, composition........ 188
Leg bands for hens........ 19
Legumes, fertilizer formulas........ 148
Linseed meal........ 54
  composition........ 44, 189
Maple borer........ 181
Meat meals and ground scraps........ 57
Meteorology........ 215
Middlings, composition........ 189
Milk yield in feeding experiments........ 123, 126
Milling experiment with entire wheat flour........ 77
  of wheat........ 64
Mixed feed........ 58
Molasses grains........ 57
Mulching for apple trees and gooseberries........ 210
Nematode worms in fish........ 181
Nests, trap........ 17
Newspaper bulletins........ 209
Nitrogen balance with sheep and steers........ 205
  forms used in fertilizers........ 23
  income and outgo, sheep and steers........ 205
  in urine, sheep and steers........ 206

PAGE

Notolophus antiqua........ 164
  definita........ 164
  leucostigma........ 164, 179
Nuclei, non-fusion........ 87
Oat smut and its prevention........ 212
Œdemasia concinna........ 164, 179
Old tussock moth........ 164
Orchard caterpillars in wild cherry........ 162
  insects........ 153
  tent caterpillar........ 162
Pelecinus........ 180
Phosphoric acids, forms used in fertilizers........ 24
Pieris rapæ........ 180
Pioneer roosting closet house........ 12
Plaginotus speciosus........ 180
Plant food in soil and sod........ 137
  removed by crops........ 136
Pollen, impotent........ 85
  tubes, incomplete development........ 85
Pollination process........ 82
Porthetria dispar........ 161
Potash in commercial fertilizers........ 24
Potato fertilizer formulas........ 140
  home mixed, composition........ 133
Poultry, feeding........ 19
  houses, construction........ 11, 13, 14
  management........ 1
  yards........ 16
Promethea moth........ 165
Protein, cost in feeding stuffs........ 59
Publications........ viii
Reciprocal crosses, bibliography........ 98
  study of........ 81
Red currant tomato, crosses........ 88
Red-humped caterpillar........ 164
Refuses from oats and corn........ 57
Retopping sweet apple trees........ 209
Rhagoletis pomonella........ 169
Robber flies........ 179
Roller mills........ 65
Rotation, fertilizers........ 151
Samia cecropia........ 165
Sanford corn silage........ 190
Schizoneura tessellata........ 179
Seed, formation........ 82
Seeds, test of vitality........ 211
Sheep, digestion experiments........ 185

PAGE
Silage, clover, composition ... 188
  Leaming corn, composition ... 188
  Sanford corn ... 190
Silpha ... 180
Soy bean and corn silage, composition ... 189
      digestibility ... 119
    hay, composition ... 118
    silage composition ... 118
      digestibility ... 119
      for cows ... 122
Soy beans compared with corn fodder ... 120
    composition ... 118
    conditions of growth ... 114
    description ... 113
    digestibility ... 119
    fertilizing and culture ... 115
    harvesting ... 116
    in Maine ... 113
    nutritive value ... 117
    varieties ... 114
    yield ... 117
    yield of protein ... 120
Spring wheat bran, composition ... 190
Squashes, cross-fertilization ... 81, 91
Station, historical sketch ... ix
Steers, digestion experiments ... 185
Timothy hay, composition ... 188, 189
Tomatoes, cross-fertilization ... 81
Trap nests ... 17
Treasurer's report ... 218
Trypeta pomonella ... 169
Tussock moth ... 164
Union grains ... 56
    feeding experiments ... 124
Urine, sheep and steers, nitrogen contained in ... 206
Valuation of fertilizers ... 25
Vitality of seeds ... 211
Warmed house for hens ... 11
Weather report ... 215
Weights of concentrated feeds ... 60
Well-marked tussock moth ... 164
White-marked tussock moth ... 164
Willow cone gall ... 180
Wheat bran ... 68
    composition ... 79, 188
    and middlings ... 58
    structure ... 63

PAGE
Wheat endosperm 62
  flour, entire 61
  germ 62
  hard, composition 68
  kernel, anatomy 61
  middlings, composition 191
  milling 64
  products, distribution of nitrogen and ash 80
  yield in flour and offals 67
Winter wheat mixed feed, composition 188
Yards for poultry 16
Yellow plum tomato, crosses 88



HOLMES HALL, 1904.

TWENTY-FIRST ANNUAL REPORT

OF THE

Maine Agricultural Experiment Station

ORONO, MAINE.

1905.

AUGUSTA
KENNEBEC JOURNAL PRINT
1906

MAINE
AGRICULTURAL EXPERIMENT STATION
ORONO, MAINE.

THE STATION COUNCIL.

PRESIDENT GEORGE E. FELLOWS	*President*
DIRECTOR CHARLES D. WOODS	*Secretary*
JOHN A. ROBERTS, Norway	*Committee of Board of Trustees*
CHARLES L. JONES, Corinna	
ALBERT J. DURGIN, Orono	
AUGUSTUS W. GILMAN, Foxcroft	*Commissioner of Agriculture*
EUGENE H. LIBBY, Auburn	*State Grange*
CHARLES S. POPE, Manchester	*State Pomological Society*
RUTILLUS ALDEN, Winthrop	*State Dairymen's Association*
JAMES M. BARTLETT	*Members of the Station Staff*
LUCIUS H. MERRILL	
FREMONT L. RUSSELL	
WELTON M. MUNSON	
GILBERT M. GOWELL	
EDITH M. PATCH	

THE STATION STAFF.

CHARLES D. WOODS	*Director*
JAMES M. BARTLETT	*Chemists*
LUCIUS H. MERRILL	
HERMAN H. HANSON	
*SANFORD C. DINSMORE	
†LEWIS I. NURENBERG	
FREMONT L. RUSSELL	*Veterinarian*
WELTON M. MUNSON	*Horticulturist*
GILBERT M. GOWELL	*Poultry Investigations*
WALTER ANDERSON	
EDITH M. PATCH	*Entomologist*
‡BESSIE G. TOWER	*Microscopist and Photographer*
ANNIE M. SNOW	*Clerk and Stenographer*
HENRY A. MILLETT	*Meteorological Observer and Janitor*

---

*Resigned June 30, 1905.

† Appointed October 20, 1905.

‡ Appointed September 1, 1905.

TABLE OF CONTENTS.

PAGE

Officers of the Station II
Announcements V
Historical notes VII
Rotting of Potatoes due to late Blight (Bulletin 112) 1
Experiments with dry Bordeaux (Bulletin 112) 6
Soluble Bordeaux for Potato Blight (Bulletin 112) 8
Experiments with Potatoes on home mixed Fertilizers (Bulletin 112) 13
Summary of Experiments in Practical Horticulture (Bulletin 113) 21
Red Clover from various Sources (Bulletin 113) 28
Fertilizer Inspection—Manufacturers Samples (Bulletin 114) 37
Feeding Stuffs Inspection (Bulletin 115) 53
Low grade and high grade Cottonseed Meal compared (Bulletin 115) 71
Food Inspection—Law (Bulletin 116) 77
Food Inspection—Standards (Bulletin 116) 80
Poultry Experiments (Bulletin 117) 93
Cereal Foods (Bulletin 118) 117
Food Inspection—Baking Powders (Bulletin 119) 137
Food Inspection—Vinegars (Bulletin 119) 143
Fertilizer Inspection—Station Samples (Bulletin 120) 153
Cottony Grass Scale (Bulletin 121) 169
Experiments in Orchard Culture (Bulletin 122) 181
Strawberry Crown Girdler (Bulletin 123) 205
Insect Notes for the Year (Bulletin 123) 213
Meteorological Observations (Bulletin 124) 229
Report of the Treasurer (Bulletin 124) 232
Index to Report for 1905 (Bulletin 124) 234
Index for Annual Reports 1901-1905 (Bulletin 124) 243

The Bulletins of this Station will be sent free to any address in Maine. All requests should be sent to

Agricultural Experiment Station,
Orono, Maine.

ANNOUNCEMENTS.

THE AIM OF THE STATION.

Every citizen of Maine concerned in agriculture has the right to apply to the Station for any assistance that comes within its province. It is the wish of the Trustees and Station Council that the Station be as widely useful as its resources will permit.

In addition to its work of investigation, the Station is prepared to make chemical analyses of fertilizers, feeding stuffs, dairy products and other agricultural materials; to test seeds and creamery glass-ware; to identify grasses, weeds, injurious fungi and insects, etc.; and to give information on agricultural matters of interest and advantage to the citizens of the State.

All work proper to the Experiment Station and of public benefit will be done without charge. Work for the private use of individuals is charged for at the actual cost to the Station. The Station offers to do this work only as a matter of accommodation. Under no condition will the Station undertake analyses, the results of which cannot be published, if they prove of general interest.

INSPECTIONS.

The execution of the laws regulating the sale of food, commercial fertilizers, concentrated commercial feeding stuffs, and agricultural seeds, and the inspection of chemical glassware used by creameries is entrusted to the Director of the Station. The Station takes pains to obtain for analysis samples of all brands of fertilizers and feeding stuffs coming under the law. It also draws samples of agricultural seeds and foods in the hands of dealers. The co-operation of dealers and consumers is, however, essential for the full and timely protection of their interests.

Foods. Dealers and consumers are invited to send by prepaid express original and unbroken packages of food materials on sale in Maine of whose purity they are for any reasons suspicious. As prompt free analysis will be made of such samples as circumstances will allow.

Feeding Stuffs. The Station will promptly analyze samples of feeding stuffs sold in Maine taken in accordance with directions which will be furnished on application. The results will be reported without charge to interested parties. This applies to dealers and consumers alike.

Commercial Fertilizers. It is difficult to draw accurate samples of commercial fertilizers. On this account it is only in rare instances that the Station undertakes analyses of fertilizers other than the samples collected by its representatives. In case there is special reason for an examination, the Station invites correspondence on the subject.

Agricultural Seeds. Samples of agricultural seeds on sale in Maine, taken in accordance with directions which can be obtained on application to the Station, will be examined as promptly as possible and the results reported free of charge.

In all cases samples should be accompanied by a full description of the goods, including the name and address of the dealer and the sender. Small samples other than liquids can be forwarded by mail. Others should be forwarded by express, charges prepaid.

STATION PUBLICATIONS.

The Station publishes several bulletins each year, covering in detail its expenses, operations, investigations and results. The bulletins are mailed free to all citizens who request them. The annual report is made up of the bulletins issued during the year.

CORRESPONDENCE.

As far as practicable, letters are answered the day they are received. Letters sent to individual officers are liable to remain unanswered, in case the officer addressed is absent. All communications should, therefore, be addressed to the

Agricultural Experiment Station,
Orono, Maine.

The post office, railroad station, freight, express and telegraph address is Orono, Maine. Visitors to the Station can take the electric cars at Bangor and Old Town.

The Station is connected by telephone.

HISTORICAL NOTES FOR 1905.

FOOD AND SEED LEGISLATION.

The legislature of 1905 passed a pure food law and supplemented the law regulating the sale of agricultural seeds. The director of the Station is the executive officer of both of these controls. The details of the food legislation is given on pages 77 and following of this report. A bulletin on seed inspection is in preparation and will be published early in 1906.

CHANGES OF STAFF.

Mr. S. C. Dinsmore resigned as assistant chemist in June, 1905, to accept an appointment with the Nevada Experiment Station. Mr. Lewis I. Nurenburg, B. S., Harvard, 1905, has been appointed in his place. Miss Bessie G. Leeds, B. A., University of Minnesota, 1905, was appointed September 1 as a general assistant. Miss Leeds will do the photographic work of the Station and will assist in the analyses of foods and seeds.

THE INCUBATOR HOUSE.

The Station, as described on pages 105 and following of this report, is unusually well equipped along the lines of poultry investigation, with the exception that the rooms used for incubation work were unsatisfactory. An incubator house 31 x 31 feet, was erected in the fall of 1905. The building is one story in height with a good attic, and airy basement. The basement is used for the incubators and is supplied with 18 machines having a capacity of 6480 eggs. Two flues provide ample ventilation. The remainder of the building is finished as a tenement for the poultry man.